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Natural History.

LETTERS ON THE REVOLUTIONS OF THE GLOBE.

BY M. ALEX. B.

La légère couche de vie, qui fleurit à la surface du globe, ne couvre que des ruines.

Paris: printed, 1824.

[*Translated expressly for the Kaleidoscope from a recent French Work.*]

LETTER II.—Of the internal Mass of the Globe.

It is well known that the form of our earth is that of a spheroid, rather flattened at the poles. Its radius is 1500 leagues in length. The highest mountains are not elevated more than two leagues above the level of the sea; there are very few countries, whose natural situation is below that level, and the greatest depths that have been attained, in digging quarries and mines, do not exceed 1800 feet. The inequalities of the soil are then very inconsiderable, when compared with the total mass of the terrestrial spheroid; and if the profound abysses which yawn upon its surface inspire us with terror, if we behold with wonder the lofty mountains whose summits are lost in the clouds, it is because we compare them with the extremely diminutive objects by which they are surrounded.

The contour of the earth, whose surface now appears to us so rugged, would, if comprehended at a single glance, present the appearance of a globe as smooth as those which have received the last polish from the hands of the artificer.

Let us suppose the inequalities upon the surface of the earth imitated in relievos upon a ball of three inches in diameter, representing the terrestrial spheroid. Protuberances almost imperceptible, even with microscopic aid, would supply the place of the highest mountains; the slightest scratch would be deeper in proportion to its diameter than are our greatest artificial cavities relatively to that of the earth; and the condensed vapour, occasioned by breathing upon its surface, would, perhaps, be too thick to represent the atmosphere to the height where clouds are formed.

As for ourselves, imperceptible atoms who vegetate in this thin layer of humid air, it is impossible to describe, by any comparison, our insignificance, and the insufficiency of our agency to the operation of any change upon the globe.

Nevertheless, we have measured the earth, whose dimensions reduce us to comparative nothingness; we have measured the sun, which is a million times larger than the earth; we have calculated the distance which separates us from that star, whose lustre our weak vision cannot support; we have discovered in the millions of stars which shine in the firmament, so many suns scattered in the immeasurable regions of the universe, and carrying along with them opaque globes, whose movements they regulate. Capable of elevating ourselves to the idea of infinity, the earth, lost in boundless space, appears to dwindle before us to the diminutiveness of a grain of sand.

Is there not, then, Madam, cause to exult in the superior nature of the mind of man, which demands for the exercise of its powers a scope so far exceeding the narrow limits of the circle in which nature has condemned him to vegetate? I will not, however, add one word more upon this subject; let us only remember, in all our future inquiries respecting the causes of the revolutions which our globe has undergone, how insufficient are our means of investigation to the discovery of the great truths of which we are in search, and how uncertain and irregular must be our progress towards it.

The terrestrial spheroid is generally divided into two parts, whose limits are arbitrarily fixed; the *internal mass*, that is to say, the central part, to which we shall never be able to penetrate; and the *mineral crust*, which serves to envelop the internal mass; the latter may be supposed to be ten or twelve leagues in thickness, but only its most superficial part is exposed to our observation.

To these two principal parts, may be added two others, which require to be studied separately, *the mass of waters* which cover more than three-quarters of the surface of the spheroid, and the *atmospheric mass*, which is a thin fluid entirely surrounding our globe, and extending to an indeterminate height. We shall first speak of the internal mass.

Every one has, perhaps, at some time or other, felt curious to know, whether the whole mass of the globe consist of a succession of layers analagous to those observed near its surface, or whether the same kind of substance being always found at a certain distance from every point of its surface, it may thence be concluded that the interior of the globe is entirely composed of it. For the solution of these questions, geologists have imagined hypotheses widely differing from each other. They have successively supposed the interior of the earth to be filled with water, gas, with an enormous mass of loadstone, and with metals, either in a solid or a liquid state.

Diderot, whose principal object it was to explain the magnetic action of the earth, considered its internal part to be formed of a vitrified nucleus, upon which the friction of the exterior moveable shell produced the same effect, as that caused by the rubbing of the cushions of an electrical machine against its cylinder.

The most probable of all these hypotheses, and the only one compatible with all the phenomena that have till now been observed, is that in which it is admitted that the internal mass is composed of metallic matter kept in a state of fusion by the action of heat.

We know the exact magnitude of the earth, and it is also possible for us to calculate its weight. Natural philosophy and astronomy furnish us with two different means of attaining this knowledge. The result of each of these is a weight so considerable, that the interior of the earth must necessarily be five or six times more dense than the mineral crust, supposing the latter to consist entirely of a succession of layers similar to those observed near its surface. The internal mass is therefore formed neither of gas nor water, nor even of the hardest stone with which we are acquainted. In any of these cases, its weight would be three or four times less considerable than we have reason to believe it to be; but it must consist entirely of substances as heavy as our heaviest metals.

These metals, as they exist in the internal mass, have not the solidity imparted to those exposed to the temperature which reigns upon the surface of the soil. All circumstances concur to prove that they are subject to the action of a heat capable of keeping them in a state of constant fusion. This fact is demonstrated by the enormous masses of liquid metallic matter ejected by volcanos.

There is every reason to believe, as we shall soon see, that the *foci* of volcanos are situated at immense depths under the soil. Besides, the number of volcanos, as well extinct as burning, which is infinitely more considerable than is generally thought, and the perfect resemblance existing between the lavas of those situated in the most distant places, cannot be explained by any of the local causes by which philosophers were for a long time willing to account for them. This resemblance naturally leads to the supposition, that they derive their common origin from a burning mass, identical in its composition. Mineral springs and thermal waters of every kind, some of which still preserve the heat of boiling water when they issue from the grouud, present us with new proofs of the high temperature existing at a certain depth under the surface of the earth.

We are indebted to M. Trebra, the director of the mines, for one of the most curious observations that have been made in modern times. This gentleman having had occasion to visit the deepest artificial cavities, discovered that the temperature constantly rises, in proportion as we approach the centre of the earth, and that this augmentation takes place in a regular manner, that is, at the rate of a degree in 150 metres. Consequently, in very deep mines the heat becomes insupportable.

You will easily understand, Madam, how impossible it is to suppose, after this discovery, that the earth has no other heat than that communicated to it by the rays of the sun. This solar heat, though capable of producing upon its surface the changes of the seasons, and the alternate temperatures of day and night, does not extend its influence to any considerable depth, as may be perceived by the coolness of all subterraneous places. A thermometer, placed at the observatory, at the depth of eighty-seven feet under the ground, did not, during the hottest summers and coldest winters of the priod between the years 1787 and 1819, vary 1-37th of a degree.

The temperature is generally admitted to be invariable at the depth of 100 feet below the surface of the earth; but instead of continuing at the same degree at all depths below that point, it then begins gradually to increase, in proportion as we approach the centre of the earth.

The more we reflect upon the subject, the more we are convinced how extremely limited and superficial is the action of the solar heat. The effect produced by it is scarcely perceptible, except in places where it is concentrated by the reflexion of surrounding objects. So inconsiderable is its influence upon high mountains, that the summits even of those situated under the equator are covered with snow, which does not begin to melt at any height exceeding that of 4,800 metres above the level of the sea.

If the mineral crust were less thick, the internal heat, penetrating more easily to the surface of the soil, would probably occasion there a temperature much more elevated than that which we feel in the present state of things. It is, therefore, the general opinion that the surface of the earth is constantly growing cooler, although so slowly that the change is hardly perceptible.

Many naturalists have even been led to consider our globe as a small incrustated sun. According to them, its whole mass must primitively have been incandescent like that of the sun; since it began to move in space, it has become sufficiently cold, to permit its exterior part to grow solid. This hard envelope has, in the course of ages, increased in thickness; and the earth, thus growing cold by degrees, is irrevocably condemned finally to be converted into a frozen lifeless mass, revolving round a sun, whose heat, also gradually diminishing, will at length be entirely exhausted.

Do not, Madam, entirely despise this opinion, which has been admitted by Buffon; be not either too much disheartened by the probability that it is well founded, as other learned men have encouraged us to hope that its correctness may very reasonably be doubted. It is true that many of them do not promise us a much more agreeable fate; they condemn us, or rather our descendants, to see our rivers, lakes, seas, and oceans gradually evaporate, until the earth, being dried up, will be set on fire by the sun. Upon the whole, I should prefer this mode of destruction to the other; it is more prompt, and the splendid conflagration which it leads us to anticipate, is less terrific to the imagination, than the lingering frozen death threatened by Buffon.

Some chemists have assured us that the earth will again revive from its ashes, and that this great combustion will occasion so considerable a quantity of water, that it must evaporate for several centuries, before some continents can be left dry. The form of the earth is exactly that which would be impressed upon its mass, by the action of gravity, if it were in a liquid state; and this fact was for a long time produced to corroborate the hypothesis of the earth's primitive state of incandescence.

Voltaire has much ridiculed Maupertuis, for having proposed the expedient of piercing a hole to the centre of the earth; this would nevertheless be the surest means of discovering what species of matter is there contained; yet, if our conjectures be well founded, it would be impossible to penetrate far, on account of the extreme heat that would soon become perceptible. Whatever might be the success of such an attempt, it would at least be curious to ascertain the kind of obstacle that would prevent its completion, and I cannot help regretting that no sovereign has yet undertaken an enterprise so worthy of awakening ambition. One step has been made towards the accomplishment of a work of this nature in the labours already executed in the deepest mines.

I shall terminate this letter by remarking, that however considerable the number of volcanos may be in our days, it must formerly have been much greater.

There is no country in which traces of extinct volcanoes do not abound; they are discovered by the beds of lava with which they have covered the surrounding soil, and which often extend to very great distances.

Some geologists have even gone so far as to believe that all mountains had a volcanic origin; but they were wrong. It is at least certain that the number of ancient volcanos is, by the result of the most enlightened researches, daily demonstrated to have been much greater than it has till now been supposed. It is impossible, in France, to make excavations for fifty leagues in any direction, without finding beds of lava. The first volcanos of the earth were opened in the primitive soil before the secondary soil was formed; they have since been covered by layers of soil, of which the successive formation has so evidently been occasioned by the sea or immense lakes of fresh water.—But, without anticipating what I shall presently have to say upon this subject, I will be contented with remarking that this immense quantity of volcanos opened in the primitive soil, while the solid crust was less thick, tends much to confirm the opinions of which I have spoken to you.—The comparative infrequency of volcanic eruptions in latter times may be accounted for as well by the diminished activity of the internal focus, as by the increased thickness of the layer by which it is covered.

Scientific Records.

[Comprehending Notices of new Discoveries or Improvements in Science or Art; including, occasionally, singular Medical Cases; Astronomical, Mechanical, Philosophical, Botanical, Meteorological, and Mineralogical Phenomena, or singular Facts in Natural History; Vegetation, &c.; Antiquities, &c.; List of Patents;—to be continued in a series through the Volume.]

RAIL-WAYS.

In the *Mercury* of the 17th instant, the editors ventured to dissent in opinion from the able editor of the *Scotsman*, on the subject of some of the positions laid down in the following article. The view taken by the *Mercury* derives additional countenance from an able correspondent of that journal, whose letter appeared last Friday. In order that our scientific readers may be enabled to decide between the *Mercury* and the *Scotsman*, it is only fair that we here insert the whole of the original article, out of which a discussion has arisen, which will, in all probability, be further prolonged. We shall also give a place here to the comments of the *Mercury* on that article, omitting the paragraphs commented upon, as they will be found in the extract from the *Scotsman*.—*Ed. Kal.*

[FROM THE SCOTSMAN.]

In our last we gave a brief account of the nature and construction of railways. We now pursue our inquiry into the effects of a determinate force of traction employed on railways and canals.

In calculations respecting the power of a horse exerted in different modes, errors often arise from considering this power as a constant quantity, which it is not. At a *dead-pull*, an ordinary horse exerts a force of traction equal to 150 pounds; this is reduced to less than one-half when he travels four miles an hour; to one-ninth part when he travels eight miles an hour; and at 12 miles an hour, his whole strength is expended in carrying forward his own body, and his power of traction ceases. It is supposed here that the horse performs pretty long journeys. When travelling very short stages, he may exert a force considerably greater; and his power of traction may perhaps cease only at a velocity of 15 or 16 miles an hour. But in common cases a velocity of 12 miles may be taken as the maximum, and for the convenience of calculation the dead-pull may be taken at 144 pounds. Adopting, then, Professor Leslie's rule, the force of traction at any degree of velocity (v) will be$=(12-v)2$. Thus, the force exerted, at 2 miles an hour, will be 100 pounds; at 4 miles, 64 pounds; at 6 miles, 36 pounds; at 8 miles, 16 pounds; and at 10 miles, only 4 pounds. Steam-engine makers assume a horse-power to be equal to a weight of 180 or 200 pounds, but this is to be considered merely as an arbitrary and conventional standard, adopted for a particular purpose. It is necessary to keep this general conclusion in view when we speak of the application of horse-power to the traction of loaded waggons and vessels.

The resistance to the motion of a vessel in the sea or a canal, is of an extremely different kind from that which a carriage of any kind experiences upon a common road or a railway. In the former case it arises from the pressure of the water on the bow and sides of the vessel; in the latter, from the friction of the axle in its box, and that of the rim of the wheel on the gravel or iron rail. The motion of the body in both cases is resisted also by the air; but this resistance, which is small in amount, generally speaking, we shall throw entirely out of view in the first instance, in order to simplify our calculations.

On a well-made road a horse will draw a load of one ton, in a cart weighing 7 cwt. at the rate of two miles an hour.—(*Leslie's Elements*, p. 253.) The whole strength of the horse is exerted in overcoming the friction. On such a road, therefore, a force of traction of 100 pounds moves a weight of 3000 pounds, or the friction is 1-30th part of the load (the cart included.)

On a railway of the best construction, it has been shown in our former paper, that a horse travelling at the same rate of two miles an hour, draws 15 tons, including the vehicles. In this case, then, a power of traction of 100 pounds moves a weight of 33,600 pounds; the friction, of course, is 1-366th part, or, in round numbers, 1-300th part of the load.

On a canal, a horse, travelling at two miles an hour, draws 30 tons in a boat weighing probably 15 tons.* Reducing the ton to 2000 pounds for the sake of round numbers, as in the last calculation, we find here that a power of traction of 100 pounds moves a mass of 90,000 pounds; or the resistance which the water opposes to the motion of the vessel is equal to 1-900th part of the load, or entire weight. At sea, where the water way is of unlimited breadth, the resistance is probably one-third less; but, as a compensation for this, when steam power is employed, there is probably a loss of one-third in consequence of the disadvantageous mode of its application.

We see, then, that the effect produced by the draught of a single horse is ten times as great upon a railway, and thirty times as great upon a canal as upon a well-made road. Yet a railway costs only about three times as much as a good turnpike road,* and a canal about nine or ten times! and the expense of keeping the railway and canal in repair is probably less in proportion to the original outlay, than in the case of a road. It is obvious, then, that were railways to come into general use, two-thirds or more of the expense of transporting commodities would be saved. With regard to the comparative advantages of canals and railways, so far as the present facts go, we may observe, that if a horse power effects three times as much upon a canal as upon a railway, the canal costs about three times as much, and will of course require nearly the same rates or *dues* per ton to make the capital yield the same interest.

But here it is of great importance to recollect that this computation refers solely to a velocity of *two miles an hour*. If the friction which impedes the motion of a car or waggon, and the resistance which the water offers to the progress of a ship, were governed by the same laws, the same conclusions would hold true whatever the velocity might be. But this is far from being the case, as we shall presently see. In illustrating this point, it will be convenient, instead of estimating effects by the variable measure of a horse power, to refer to a determinate and constant force of traction of a given amount. We shall therefore assume, that the body to be moved is urged forward by force exactly equivalent to a weight of 100 pounds, suspended over a pully at the end of the plane on which it moves.

First, with regard to the motion of a body in water. It is deduced from the constitution of fluids, and confirmed by experiment, that the resistance which a floating body encounters in its motion through the fluid is as the square of the velocity.† Now, taking as a basis the known effect of force of traction of 100 pounds at two miles an hour, let us ascertain what force would move the same body at a greater velocity. On the canal, or arm of the sea, we have seen that a body weighing 90,000 pounds is impelled at the rate of two miles an hour by a force of 100 pounds; therefore, to move the same body

At 4 miles an hour, will require...			400 pounds.
At 6	ditto	ditto	900 ditto.
At 8	ditto	ditto 1600	ditto.
At 12	ditto	ditto 3600	ditto.

Or conversely:—

100 pounds moves 90,000 pounds	at 2 miles an hour.	
or 22,500	at 4	ditto.
or 10,000	at 6	ditto.
or 5,620	at 8	ditto.
or 2,500	at 12	ditto.

Hence we see that when we have to contend with the resistance of water, a great increase of power produces but a small increase of velocity. To make a ship sail *three* times faster, for instance, we must employ *nine* times the power; and to make her sail *six* times faster, we must employ no less than *thirty-six* times the power. Let us suppose, for example, that it were required to determine, since one horse draws a boat, loaded with thirty tons, at two miles an hour, how many horses would draw the same boat at four miles. We find, first, that since the boat is to move *two* times as fast, it will require *four* times the absolute amount of power, or 400 pounds. But a horse, moving at four miles an hour, pulls only with a force of 64 pounds. Of course, it would require six horses to exert a power of 400 pounds, and move the boat at the rate proposed.

Let us now see what amount of power will produce corresponding effects upon a railway. And before we make more particular inquiry, let us suppose that the retardation occasioned by friction, instead of increasing as the square of the velocity like the resistance of a fluid, increases in the simple ratio of the velocity. We have seen, then, that a force of traction of 100 pounds, upon a level railway, moves a body weighing 30,000 pounds, at the rate of

* Boats in some cases carry only 15 or 20 tons; in others 35 (as the coal boats on the Union Canal) but in the one case they travel quicker, and others slower, than the rate mentioned.

* In Mr. Telford's estimates for portions of new road between Edinburgh and Wooller, we find the expense to be from £1000 to £1100 per mile, including the price of the ground.

† See Playfair's Outline, I. 198.; Leslie's Elements, section vii. article *Resistance*; Encycl. Brit.

two miles an hour. We may hence calculate the effect produced by any greater amount of power:

30,000lb. are moved at 2 miles an hour by a power of 100lb.
at 4 miles by 200lb.
at 6 miles by 300lb.
at 8 miles by 400lb.
at 12 miles by 600lb.

Or conversely:

A power of 100 pounds moves 30,000lb. at 2 miles per hour.
or 15,000lb. at 4
or 10,000lb. at 6
or 7,500lb. at 8
or 5,000lb. at 12

Hence we see that, though a moving force of one hundred pounds produces three times as great an effect upon a canal as upon a railway *at two miles an hour*, this superiority of the water conveyance is lost, if we adopt a velocity at six miles an hour, and at all greater velocities the same expenditure of power will produce a greater effect upon a railway, than upon a canal, a river, or the sea.

This calculation proceeds on the hypothesis that the friction increases in the simple ratio of the velocity. Such was the opinion of Ferguson, Mushenbroch, and some other writers; but the more recent and accurate experiments of Coulomb and Vince have overthrown this doctrine, and established conclusions extremely different, of which the following is an abstract:*

1. The friction of iron sliding on iron is 28 per cent. of the weight, but is reduced to 25 per cent. after the body is in motion.

2. Friction increases in a ratio nearly the same with that of the pressure. If we increase the load of a sledge or carriage four times, the friction will be nearly, but not quite, four times greater.

3. Friction is nearly the same whether the body moves upon a small or a greater surface; but it is rather less when the surface is small.

(a) It is with this last law only that we have to do at present; and it is remarkable that the extraordinary results, to which it leads, have been, so far as we know, entirely overlooked by writers on roads and railways. These results, indeed, have an appearance so paradoxical, that they will shock the faith of practical men, though the principle from which they flow is admitted without question by all scientific mechanicians.

(b) First, It follows from this law that, abstracting the resistance of the air, if a car were set in motion on a level railway, with a constant force greater in any degree than is required to overcome its friction, *the car would proceed with a motion continually accelerated, like a falling body acted upon by the force of gravitation*; and however small the original velocity might be, it would in time increase beyond any assignable limit. It is only the resistance of the air, increasing as the square of the velocity, that prevents this indefinite acceleration, and ultimately renders the motion uniform.

(c) Secondly, Setting aside, again, the resistance of the air (the effects of which we shall estimate by and by) *the very same amount of constant force which impels a car on a railway at two miles an hour, would impel it at ten or twenty miles an hour*, if an extra force were employed at first to overcome the *inertia* of the car, and generate the required velocity. Startling as this proposition may appear, it is an indisputable and necessary consequence of the laws of friction. In fact, assuming that the resistance of the air were withdrawn, if we suppose a horizontal railway made round the globe, and the machine (supplied with a power exactly equivalent to the friction) to be placed on the railway, and launched by an impulse with any determinate velocity, it would revolve for ever with the velocity so imparted, and be in truth a sort of secondary planet to our globe.

Now, it would be at all times easy (as we shall afterwards show) to convert this accelerated motion into a uniform motion of any determinate velocity; and from the nature of the resistance, a high velocity would cost almost as little, and may be as easily obtained as a low one. For all velocities, therefore, above four or five miles an hour, railways will afford facilities for communication prodigiously superior to canals or arms of the sea. Indeed, there is scarcely any limit to the rapidity of movement these iron pathways will enable us to command; and we cannot give a better idea of the astonishing power they put into our hands, than by referring to the remark of Dr. Young, quoted in our last. What he states is strictly true, that the resistance of the air, which, with the velocities and powers of traction we now commonly employ, is an element that may be entirely neglected, would then become the principal retarding force. We need scarcely add, that the question of time or velocity, rightly considered, involves every thing connected with the mercantile advantage of different modes of communication.

We have here considered the subject in a purely theoretical light, leaving it to the engineer to find the means of giving effect to the truths we have stated. We shall enter into various details in a future paper, and touch upon some points of a practical nature. In the mean time we think it right to say, that the conclusions we have announced are strictly conformable to experiments carefully made by Vince and Coulomb,—but as there are anomalies in the doctrines regarding friction, and as the velocities employed in the experiments alluded to were much lower than some that are likely to occur in railway communications, we do not take upon us to guarantee the literal accuracy of the principles laid down as applicable to every possible velocity. We certainly believe that the conclusions founded upon in our calculations, will hold true at all the velocities whatever, and they are stated without limitation by the most profound mechanicians, Leslie, Playfair, Young, &c., but we thought it right to mention a circumstance which some may consider as materially affecting their universal application.

* Leslie's Elements, p. 188, &c.; Playfair's Outlines, I. 89, &c.; Journal de Physique, 1785; Philosophical Transactions, 1785. Dr. Brewster has given the results of Coulomb's experiments in a tabular form, in the article *Mechanics*, in his Encyopedia

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[FROM THE LIVERPOOL MERCURY.]

RAIL ROADS AND NEW MECHANICAL PARADOX.—In a late number of the *Scotsman*, an article appeared on the subject of rail-ways, which is of so extraordinary a nature, that we shall appropriate the whole of it in the scientific department of the *Kaleidoscope*, in the hope that some of our readers may be induced to investigate certain paradoxical positions therein laid down, which we suspect to be erroneous. The phenomenon, to which we especially allude, and which merits the appellation of the second "*Mechanical Paradox*," we shall here notice in the words of the Northern journalist; to which we shall subjoin a few remarks of our own, suggested by a cursory reading.

The principal part of the article consists of calculations respecting the respective resistance of bodies moving on ordinary roads, in a fluid, and on rail-roads.

On the subject of friction, certain results, deduced from the opinions of eminent mathematicians, are stated, one of which (4) is, that "the friction of rolling and sliding bodies follows nearly, but not precisely, the same law as to velocity; and that law is, that *the friction is the same for all velocities*."

[Here follow the three paragraphs to which we have affixed the letters (*a*) (*b*) (*c*).]

The *Mercury*, in reference to these three paragraphs, then proceeds as follows:

Well might the writer in the *Scotsman* assert, that these facts (if such they be) will shock the faith of practical men. He might have added, and of theoretical men also. For our own parts, while we avow our own disbelief of the theory, we do it with all the diffidence befitting persons whose knowledge of such subjects has been superseded by other and more urgent speculations; and if we are mistaken in the view we take of the matter, our consolation must be, that we err in common with many others with whom we have conversed on the subject, who all view it in the light in which it presented itself to us at first sight.

If we understand aright the position which we venture to question, it is, that a locomotive machine, set in motion on a level railway, with a constant force greater in any degree than is required to overcome the friction, would proceed with a motion continually accelerated, like a falling body acted upon by the force of gravitation, and however small the original velocity might be, would in time increase "beyond any assignable limit," provided the pressure of the air did not act as a check to limit and equalize the rate.

Now, if this phenomenon should happen, were the atmosphere abstracted, it seems natural to conclude, that it would be observable in a less degree under ordinary circumstances: in which case, so singular a fact could scarcely have escaped the observation of practical men, who have for years witnessed the operation of locomotive machines.

If, however, the atmosphere act as a kind of regulator or fly-wheel, to limit or equalize the motion, the phenomenon may be put to the test, under circumstances very analagous to those supposed by the hypothesis of the Scotch theorist. A small wheel carriage may easily be constructed, to be impelled forwards by clock-work. Such a carriage may be made to revolve in a small circle; and, indeed, we have seen a model of the kind in operation. Now, if this machine were placed under the receiver of as perfect an air-pump as can be constructed, and put into motion; if the theory under investigation be correct, a visible acceleration in speed ought to take place. But we will wager a few pounds with our brother editor, that no such result will occur; and if we win, we will expend the amount in books for our Apprentices and Mechanics' Library.*

We cannot divest ourselves of the persuasion that bodies, moving on an horizontal plane, even if there were no opposition from the atmosphere, do not follow the law of bodies falling perpendicularly to the earth.

A body falling, or gravitating to the earth, moves quicker as it approaches it:—the earth being the source of attraction, acts more powerfully upon the body attracted the nearer it approximates it.

If a magnet (and such the centre of the earth may be regarded, by way of illustration) be held at a distance from a steel ball, it will attract it in a ratio increasing as the squares of the distance decrease;—the magnet being the source of attraction, the ball must necessarily accelerate in speed, until the two bodies come into contact. But it appears to us that a locomotive machine, moving on a plain, even if the air were annihilated, is altogether under different circumstances. There is no goal before it, to which it is drawn by attraction or gravitation. There is simply a machine of a limited power; and until we can believe that indefinite and similar effects can result from definite and dissimilar causes, we cannot believe the proposition, that the velocity of a locomotive machine, under the presumed circumstances, would increase "beyond any assignable limit."

* As we have always professed ourselves inimical to gambling in any shape, our only excuse, on the present occasion, must be the purpose to which we should apply the winnings, if they should happen to fall to our share.

Miscellanies.

Two of our living poets were conversing on the actors—"Your admiration of Mrs. Siddons is so high," said Rogers, "that I wonder you never made open love to her." "To that magnificent and appalling creature! I should have as soon thought of *making love to the Archbishop of Canterbury*."

The Prices.—Four gentlemen of the name of Price, all of very different dimensions, are members of a literary society, and are thus distinguished by the other members: the tall one is called *High Price*, the short one, *Low Price*, the fat one, *Full Price*, and the thin one *Half Price*.

Latour Maubourg lost his leg at the battle of Leipsic. After he had suffered amputation with the greatest courage, he saw his servant crying, or pretending to cry, in one corner of the room. "None of your hypocritical tears, you idle dog," said his master; "you know you are very glad, for now you will have only one boot to clean instead of two."

At the theatre one evening, whilst Munden and Fawcett were dressing, the latter observing the former screwing up his face before a looking-glass, asked him "if he had *bottled* his eyes?" "Yes," returned Munden, "and I am now going to *cork* my eye-brows."

A gentleman who had neither voice nor skill, once attempting to sing in company, when he had come to a conclusion, Bannister said, "Your song, sir, is like the small pox."—"How is that?" said the company—"explain, explain."—"Why," rejoined the wit, "*a devilish good thing when it is over*."

During the riots in 1780, a magistrate being asked why he had not called upon the *posse comitatus*, replied, "that he would have done so, but knew not his address."

Poetry.

TO THE DYING YEAR.

Fare, fare thee well, thou dying Year!
Thy parting knell is rung,
And the tear-drop glistens on thy bier,
With cypress boughs o'erhung.

Thy birth with smiles was ushered in,
And feast, and festal rout;
And merry bells, with joyous din,
From spire and tow'r rung out.

And mirth and music blest the hour,
And many a legend wild
Bade grief resign her wonted power,
While love exulting smil'd.

And meeting hands, and sparkling eyes,
Made glad thy natal day;
And withering care, and mourning sighs,
Were banished far away!

Now at thy close, how changed the scene!
The festal rout is o'er,
And the merry bells, with joyous din,
Peal forth, alas, no more!

And the lov'd and lover both are gone,
And the mourner weeps alone;
And the green grass waves o'er many a one,
That joyous, hailed thy dawn!

And the hoary head by youth is laid,
And the smiling babe at rest,
Sleeps the last sleep, ere woe might fade,
Or rend its sinless breast!

And blessed they thus early ta'en,
The infant cherub blest,
Betime snatched from a life of pain,
And borne to endless rest!

Yet still will pitying Nature weep
Beside the daisied sod;
But blest, thrice blest are they who sleep
In the bosom of their God!

Thou dying Year! thy sunny days,
But few and brief have been;
And Memory turns her tearful gaze,
On many a fitful scene!

And blighted hopes, and broken faith,
A sad and dismal train;
All, all that fate inflicts in wrath,
Revive to wound again!

And, oh! amid remembrance drear,
Scarce blooms one little flower:—
One brightening ray the heart to cheer
In retrospection's hour!

Thou dying Year, now past away,
With time before the flood!
Thy mourning rites, and festal gay,
Thy evil, and thy good!

Thou dying year, my farewell take!
'T may be, perchance, my last;
And stranger hands the lyre may wake,
That consecrates the past.

And if decreed the coming year,
Death's messenger must be;
I will not shed one coward tear,
To die is to be free!

Liverpool. G.

STANZAS ON THE DEATH OF MADAME RIEGO.

The weary is at peace! her mortal woes
At length are ended; and she sleeps the sleep
Where the long-suffering from their ills repose,
Where care finds rest and mourners cease to weep;
And shall we thoughtlessly lament the close
Of her sad pilgrimage? or vainly steep
In fruitless tears the welcome grace that Heaven
In mercy to her griefs has early given.

Oh! rather weep we o'er her agony
When for the stranger's land her parting sail
Swell'd with unwelcome winds; and her dim eye
Grew to the fading shore from which that gale
Bore her for ever; then the bitterest sigh
Broke from her heart; and her pale cheek, more pale
Became, as in the wildness of despair
She thought of him who rov'd an outlaw there.

Uncertain of his fate, from day to day,
In all the tortures of suspense, how past
Her lonely hours? how did she chide their stay,
Then, trembling, think the moments fled too fast,
Deeming in terror as they roll'd away,
Each, as it glided on, might be the last
On earth allowed him, and e'en then might gloom
O'er his dark scaffold, or his bloody tomb.

Weep for her feelings in that dreadful hour
When the dire tidings reach'd her—to that strife
The pangs of death are light, and have no power:
Oh! mourn the anguish of the widowed wife,
Sinking beneath the blow, like some crushed flower,
Whose leaves the north wind withers; so her life
Faded with silent grief to slow decay,
Dissolving like pale snow in tears away.

Far from her own fair land and southern skies
The earthly relics of the wanderer rest;
Nor recks it now to her that her cold eyes
Were clos'd by strangers; for the spirit drest
In angel splendours, freed from sorrow, flies
To seek the eternal mansions of the blest;
There in unclouded joy to meet again
Him whom on earth she lov'd and mourn'd in vain.

Reydon, near Southwold. A. S.

TO T. L.

Farewell, farewell; to a distant land
The waves of the ocean shall bear thee,
And far away to a foreign strand,
From all that's dear shall tear thee.
We've tasted together the cup of joy,
And drank deep the wormwood of sorrow;
And we've learnt that the world's a glittering toy,
That dazzles—to fade on the morrow.

Thy course is bound to a distant clime,
Where no loved form is near thee;
Where heavily flag the moments of time,
With no voice of affection to cheer thee.
When sinking beneath that sultry sun,
No such lov'd form shall caress thee;
And then should thy youthful race be run,
No parent's voice will bless thee.

Time has not furrow'd our youthful brows,
But fast the moments are fleeting;
And Age may scatter his envious snows,
Ere our hands shall join in meeting.
Tho' the voice of thy destiny calls us to part,
Nought can chill the warm tide of affection,
And till life shall depart, in the depth of my heart,
Thou shalt dwell in each fond recollection.

December 15, 1824. L.

Translation of a German Epigram.

A SCRIBBLER'S BOOK.

You'll have me praise your book, you've often hinted;
Well then! your book is beautifully—printed.

THE LATE REV. CHARLES WOLFE.

The Belfast News Letter published the following Poem said to be from the pen of the Author of the Ode on Sir John Moore:—

DEATH OF MARY.

If I had thought thou couldst have died,
I might not weep for thee;
But I forgot, when by thy side,
That thou couldst mortal be;
It never through my mind had pass'd,
That time would e'er be o'er,
When I on thee should look my last,
And thou should'st smile no more.

And still upon that face I look,
And think 'twill smile again;
And still the thought I will not brook,
That I must look in vain;
But when I speak thou dost not say
What thou ne'er left'st unsaid;
And now, I feel—as well I may,
Sweet Mary, thou art dead.

If thou would'st stay, ev'n as thou art,
All cold and all serene,
I still might press thy silent heart,
And where thy smile has been;
While ev'n thy chill bleak corse I have,
Thou seemest still mine own,
But there—I lay thee in the grave,
And now—I am alone.

I do not think, where'er thou art,
Thou hast forgotten me;
And I perhaps may soothe this heart
In thinking still of thee!
Yet there was round thee such a dawn
Of light ne'er seen before,
As Fancy never could have drawn,
And never can restore.

LA GLOIRE MILITAIRE.

RABAN.

Que te sert de chercher les tempêtes de Mars,
Pour mourir tout en vie au milieu des hasards,
Ou la gloire te mene?
Cette mort qui promet un si digne loyer,
N'est toujours que la mort qu'avec moins de peine
L'on trouve en son foyer.
Que sert à ces héros ce pompeux appareil
Dont ils vont dans la lice eblouir le soleil
Des tresors du Poctole?
La gloire qui les suit après tant de travaux
Se passe en moins de temps que la poudre qui vole
Du pied de leurs chevaux.

☞ *Perhaps some of our correspondents would favour us with a translation of these clever lines.*

FOR THE YEARS 1824 & 1825.

THE ANNALS of SPORTING, and FANCY GAZETTE; a Magazine entirely appropriated to Sporting Subjects, published on the 1st of every Month, price 2s. 6d.

The Proprietors, on the approach of a new Year, take leave to call the public attention to the increasing celebrity of this popular Work, the forthcoming Number of which (to be published on the 1st of January) will begin a new Volume, and be embellished with Two capital Engravings, viz.

1. A fine Plate of the Alpine Mastiff, by Landseer.
2. A beautiful Plate of Snipe Shooting, from a Drawing by Fielding.

The general plan of this Work is so well known to the Sporting World, that it is only necessary for the Proprietors to state that it will continue to be conducted on its present liberal scale with respect to paper, print, and illustration; and that no pains or expense will be spared to render it every way worthy of the public attention. The Sixth Volume, which is just completed, contains a variety of Original Communications, from different parts of the Kingdom, on

Hunting,	Cocking,	Cricket,
Shooting,	Pugilism,	Billiards,
Coursing,	Wrestling,	Rowing,
Racing,	Single Stick,	and
Fishing,	Pedestrianism,	Sailing.

Accompanied with the Racing Calendar, &c. The Work, complete, for the year 1824, forms Two Volumes, Price 17s. each, handsomely half-bound.

The Embellishments to these Volumes comprise a fine engraved Portrait, by Landseer, of a Cross between the Dog and Fox, from a subject in the possession of Lord Cranley; Five Fox-hounds, Portraits, of the Hatfield Hunt; a beautiful Engraving of Jerry, the Winner of the Doncaster St. Leger, from a Painting by Herring; a Perspective Elevation of the Grand Stand at Doncaster; Plans and Surveys of Doncaster, and other principal Race Courses; Portraits of the Arctic Fox, Scotch Terrier, &c.

London: Printed for Sherwood, Jones, and Co. Paternoster-row.

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NEVER IN PRINT IN EUROPE.

ETIQUETTE OF THE BALL ROOM.

The following rules have been handed to us by a correspondent, who states that they are observed at the Lower Assembly Rooms, Bath.

"That after a lady has called a dance, it being finished, her place in the next dance is *at the bottom*.

"It is deemed a point of good breeding, for ladies that have gone down the dance, to continue in their places till the rest have done the same.

"That those who stand up after the country dance is called, do take their place at the *bottom*, unless *rank* entitles them to precedence."

LONDON NORTHERN RAIL-ROAD COMPANY, to connect BIRMINGHAM, DERBY, NOTTINGHAM, HULL, and MANCHESTER with each other, with the Parts adjacent, and with the METROPOLIS.

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At a MEETING held at the London Tavern on the 13th instant, Present,
WILLIAM WILLIAMS, Esq. M.P. in the Chair, and many other Gentlemen, it was resolved—

"That a communication, by Rail-way, connecting London with Manchester and Birmingham, and also Hull with Manchester and London, would be an object of great public utility.

"That a Company be formed, with a capital consisting of Two Millions Five Hundred Thousand Pounds, for that purpose."

These Resolutions having passed, the Meeting then adjourned to Monday, the 20th instant, when the abovenamed Gentlemen were appointed as the London Direction, and the following Resolution was passed unanimously:

"That the Directors now appointed have power to select seven Directors to be added to their number, from the district through which the proposed Rail-road will pass."

The capital of £2,500,000 is to be divided into 25,000 Shares, of £100 each, of which a liberal proportion will be reserved for those persons resident in the neighbourhood of the line of the proposed Rail-road.

Applications for Shares may be made previously to the 1st of JANUARY, by letter, post paid, addressed to the Chairman, to be left at the Old London Tavern, Bishopsgate-street.

(Signed) GEORGE HIBBERT, Chairman.

This day is published, by Hurst, Robinson, and Co. 90, Cheapside, and 8, Pall Mall, London, and A. Constable and Co. Edinburgh, handsomely boarded, with engraved ornamental Covers, and Gilt Leaves, price Twelve Shillings,

THE LITERARY SOUVENIR, or CABINET of POETRY and ROMANCE,
EDITED BY ALARIC A. WATTS.

Independently of a great Variety of splendid Illustrations, designed by Fielding, Brockedon, Nash, Corbould, and other eminent Artists, and engraved (all in the Line Manner, in the most finished Style of the Art) by Heath, Finden, &c. &c. This Volume contains about Seventy ORIGINAL Articles (Prose Tales and Poems) from the Pens of Sir Walter Scott, Campbell, Montgomery, Mrs. Hemans, Maturin, Alaric A. Watts, Bowles, Hogg, Cunningham, L. E. L. Authoress of "*The Improvisatrice*," Croly, Wrangham, the author of "*May you like it*," Colton, Wiffen, Opie, Delta (of *Blackwood's Magazine*) the Rev. Thomas Dale, and many other Writers of equal Celebrity.

The *Literary Souvenir* is a very graceful and agreeable book, both inside and outside, and does infinite credit both to the Editor and Publishers. Some of our friends—Croly, Delta, and Davie Lyndsay, contribute some capital pieces.—*Blackwood's Magazine.*

This is, without exception, the most elegant and attractive little work we have seen issue from the press. The embellishments are really beautiful; but, beautiful as they are, they are only a secondary consideration. The literary department of the work is such as must secure it popularity.—*Courier, Nov.* 27.

*** A few Copies of the Work are printed in Post 8vo, with Proofs of the Plates, on India Paper, price £1 4s.

ROYAL LEWISIAN SYSTEM OF WRITING.

MR. LEWIS (from the Royal Academy, London) the real Inventor of the New Mathematical System of Writing, under the immediate and especial patronage of his Majesty and other branches of the Royal Family, and nearly every person of distinction in the United Kingdom, presents his grateful acknowledgments to the worthy inhabitants of Liverpool and its vicinity, and begs to inform them, that in consequence of the very great encouragement he has experienced, during his short residence among them, and the urgent solicitations of many respectable persons who wish to avail themselves of his instruction, he will do himself the honour of prolonging his stay in Liverpool beyond the period he had fixed for his departure to town. Mr. Lewis will, therefore, continue to receive those who apply BEFORE MONDAY, THE 17th JANUARY, BEYOND WHICH TIME HE MUST POSITIVELY DECLINE ADMITTING ANY NEW PUPIL. His system is equally applicable to persons of all ages and capacities; and, however incorrectly the Pupil may write, it will infallibly eradicate all bad habits, and communicate (in SIX SHORT and EASY LESSONS) a quick and beautiful style of Writing; so free, elegant, and expeditious, as no other method of teaching ever yet discovered can possibly impart, and from which it is impossible for him ever after to deviate.

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SEPARATE APARTMENTS FOR LADIES.

Political Economy.

MR. M'CULLOCH'S LECTURE
ON FOREIGN COMMERCE.

The following has been politely handed to us as a report of one of Mr. M'Culloch's interesting lectures. For any errors of statement which may be found in the report Mr. C. is not in any degree accountable; but we are of opinion it is substantially correct.

It will be unnecessary for me to enter into any lengthened discussion on the advantages derived from the home trade.—Its advantages are, indeed, too obvious and striking to require to be pointed out. Each province or district of an extensive country has some particular mineral, vegetable, or animal production, or some peculiarity of soil or climate, which fits it for being appropriated in preference to certain species of industry. A district which abounds in coal, which has an easy access to the ocean, and the command of an extensive internal navigation, is the natural seat of manufactures. Wheat, and other kinds of grain, are the proper products of rich and fertile soils; and cattle, after being bred in mountainous districts, are most advantageously fattened in low and meadow grounds. It is evident that the inhabitants of these different districts, by confining themselves to the particular branches of industry, for the prosecution of which they possess some peculiar natural capability, must produce an infinitely greater quantity of commodities than they could possibly do were they to apply their labour indiscriminately to every employment; and they must thus derive the same advantages from this variety of natural qualifications and powers of production as are derived by each separate individual from the division of labour.

But it is easy to see that foreign commerce, or the territorial division of labour between different and independent countries, must contribute to increase the wealth of each in precisely the same manner that the home trade contributes to increase the wealth of different provinces of the same kingdom. Distant countries are endowed with still greater diversities of climate and soil, and peculiarities of national character and political institutions than can possibly be enjoyed by the different provinces of the same country; and, consequently, the advantages resulting from the home trade must be produced by foreign commerce, on a still more extensive scale. It would evidently cost an infinitely greater expense to raise the wines of France or Spain in England, than to make Yorkshire yield the same products as Devonshire. Indeed there area

multitude of products, and some of them of the very greatest utility, which cannot possibly be raised except in particular situations. Were it not for commercial intercourse we should not be able to obtain the smallest supply of tea, sugar, raw cotton, raw silk, gold bullion, and a thousand other equally useful and valuable commodities. Providence, by giving different soils, climates, and natural productions, to different countries, has evidently provided for their mutual intercourse and civilization. By permitting the people of each to employ their capital and labour in those departments in which their geographical situation, the physical capacities of their soil, their national character and habits fit them to excel, foreign commerce has a wonderful effect in multiplying the productions of art and industry. When the freedom of commerce is not restricted, each country necessarily devotes itself to such employments as are most beneficial to each. This pursuit of individual advantage is admirably connected with the good of the whole. By stimulating industry, by rewarding ingenuity, and by using most efficaciously the particular powers bestowed by nature, commerce distributes labour most effectively and most economically; while, by increasing the general mass of necessary and useful products, it diffuses general opulence, and binds together the universal society of nations by the common and powerful ties of mutual interest and reciprocal obligation. Commerce has enabled each particular state to profit by the inventions and discoveries of every other state. It has given us new tastes and new appetites, and it has also given us the means of gratifying them. It has armed the patient hand of industry with zeal to undertake, and perseverance to accomplish, the most arduous and difficult tasks. Commerce has either entirely removed, or greatly weakened, a host of the most unworthy prejudices. It has united the whole world into one vast empire, the different kingdoms of which may be regarded as the provinces; and the same beautiful train of consequences which is produced in kingdoms by the operation of that territorial division of labour which has conferred incalculable benefits on the human race, is observable in the world at large.

England, for example, from the quality of her wool, the abundance of her coals, the skill of her workmen, and the excellence of her machinery, is enabled to manufacture cloth much cheaper and better than can be done by Portugal; while the Portuguese, from the facilities which the mildness of their climate and the fertility of their soil afford to the growth and cultivation of the grape, are enabled to produce wine with infinitely less expense, and in much larger quantities, than can be done by the English. Thus, if England were to confine herself to the manufacture of cloth, for which she has natural advantages, and if Portugal were to employ herself exclusively in the cultivation of the grape, in which occupation the peculiar productive powers of the soil enable her to excel, each country would be able to obtain larger and better supplies of both cloth and wine than if they were to engage in occupations in which the advantage was on the side of another.

But, perhaps, the *indirect* advantages of foreign commerce, in rousing mankind from sloth and indolence, and in stimulating them to activity and industry, are even more important than its *direct* advantages, and yet they are so often overlooked that I hope to be excused for dwelling on them.

That man is naturally inactive and indolent no one will attempt to deny. The highest luxury of which savage life seems to be susceptible is, to have nothing to do. The members of uncivilized communities confine their labour to merely supplying themselves with the coarsest materials of food, and providing themselves with clumsy defences against the inclemency of the weather. Their industry is only in proportion to the extent of the necessities which prompt it, and those nations which experience the greatest difficulty in supplying their necessities are in general the most industrious. Mr. Hume, Sir William Temple, and other inquirers into the progress of society, have observed, that the inhabitants of those countries which possess the greatest natural disadvantages are always the most active and industrious; and, in conformity to the principle now laid down, we should expect this to be the case. But in civilized societies, when commerce begins to extend itself, however great may be the natural advantages of the country, the inhabitants are never contented with the productions of their own soil and climate, but they eagerly grasp at those foreign commodities and luxuries which commerce brings within their reach. If an individual has obtained a sufficient quantity of corn, cloth, and beer, and if these are the only commodities which his industry can procure for him, he will cease to labour; but, when the productions of other countries are placed within his reach, he will increase his exertions that he may be enabled to obtain them. The agriculturist and manufacturer will endeavour to produce as great a quantity as possible of raw and manufactured goods, that they may be enabled to procure for themselves the conveniences and luxuries of other climates; and the merchant, finding the wants and demands of his customers increase, will be encouraged to import a larger quantity of the products of foreign countries. Thus, by gratifying the vanity and ambition of his customers, he cherishes that taste for foreign commodities which some shallow moralists have been ignorant enough to condemn, but which, nevertheless, contribute more, perhaps, than any thing else, to advance the glory and prosperity of a nation. The acquired wants of a people are much more insatiable than their physical necessities; and the passion for foreign luxuries and conveniences, when once generated, is perfectly uncontrolable. You have, then, only to place these articles within the reach of mankind, and you will infallibly banish the apathy and languor of savage life, and substitute in their stead, a spirit of activity and industry. Whatever Mr. Locke and his followers may say to the contrary, you may depend upon it that no country can ever become wealthy, or industrious, or civilised, or inventive, without commerce to stimulate the exertions of its inhabitants.

Dr. Paley had a very clear perception of this doctrine. "Flourishing cities," he says, "have been established through the manufacture of some single commodity, and populous towns have sprung into existence through the effects of commerce. A watch is a very unnecessary appendage to an agricultural labourer; but, if he is induced to till the ground in order that he may be enabled to procure one, the purposes of commerce are answered: and when the watchmaker is polishing the case, or filing the wheels of his ingenious machine, he is contributing to the production of corn, as efficaciously, though not quite so directly, as the husbandman himself. Tobacco is acknowledged to be a useless article of consumption; but, if the fisherman is induced to ply his nets, and the mariner to bring home rice from Carolina or Hindostan, in the hopes that, by doing so, they may be enabled to procure it, this article, which has apparently no other use than that of gratifying a vitiated palate, becomes the means of supplying mankind with two very useful articles of food." Deprive us of our foreign commerce, and reflect what a horror-striking diminution would be made from the sum total of our comforts and enjoyments. Instead of breakfasting on the produce of China and the West Indies, we should be obliged to content ourselves with the humble porridge of our ancestors. When our crops exceeded the quantity required for the consumption of the population, the redundancy would be useless; and, when they fell short of this quantity, we should be reduced to the extremity of famine. Our maritime greatness would fall with our commerce, and, from occupying the very highest place in the first rank of nations, we should fall to the lowest place in the fourth or fifth rank.

But, perhaps, the best summary any where to be met with, of the advantages of commerce, is to be found in one of the early papers of the *Spectator*, written by Addison, and which derives additional interest from the circumstance of its being one of the first essays which appeared in support of the benefits resulting from trade. Nothing can be better conceived, or better expressed, and it is rather extraordinary that it has not attracted the attention of any of our commercial writers.

"Nature (says Mr. Addison) seems to have taken a particular care to disseminate her blessings among the different regions of the world, with an eye to mutual intercourse and traffic among mankind, that the natives of the several parts of the globe might have a kind of dependence upon one another, and be united together by their common interest. Almost every degree produces something peculiar to it. The food often grows in one country, and the sauce in another. The fruits of Portugal are corrected by the products of Barbadoes, and the infusion of a China plant is sweetened with the pith of an Indian cane. The Phillipic islands give a flavour to our European bowls. The single dress of a woman of quality is often the product of an hundred climates. The muff and the fan come together from the different ends of the earth. The scarf is sent from the torrid zone, and the tippet from beneath the pole. The brocade petticoat rises out of the mines of Peru, and the diamond necklace out of the bowels of Indostan.

"If we consider our own country in its natural prospect, without any of the benefits and advantages of commerce, what a barren uncomfortable spot of earth falls to our share! Natural historians tell us, that no fruit grows originally among us, besides hips and haws, acorns and pig-nuts, with other delicacies of the like nature; that our climate of itself, and without the assistance of art, can make no further advances towards a plum than to a sloe, and carries an apple to no greater a perfection than a crab: that our melons, our peaches, our figs, our apricots and cherries [and Mr. Addison might have added, our potatoes] are strangers among us, imported in different ages, and naturalized in our English gardens; and that they would all degenerate and fall away into the trash of our own country, if they were wholly neglected by the planter, and left to the mercy of our sun and soil. Nor has traffic more enriched our vegetable world, than it has improved the whole face of nature among us. Our ships are laden with the harvest of every climate. Our tables are stored with spices, and oils, and wines. Our rooms are filled with pyramids of China, and adorned with the workmanship of Japan. Our morning's draught comes to us from the remotest corners of the earth. We repair our bodies by the drugs of America, and repose ourselves under Indian canopies. The vineyards of France are our gardens; the spice-islands our hot-beds; the Persians our silk-weavers, and the Chinese our potters. Nature indeed furnishes us with the bare necessaries of life, but traffic gives us a great variety of what is useful, and at the same time supplies us with every thing that is convenient and ornamental. Nor is it the least part of this our happiness, that whilst we enjoy the remotest products of the north and south, we are free from those extremities of weather which give them birth; that our eyes are refreshed with the green fields of Britain, at the same time that our palates are feasted with fruits that rise between the tropics.

"For these reasons there are not more useful members in a commonwealth than merchants. They knit mankind together in a mutual intercourse of good offices, distribute the gifts of nature, find work for the poor, add wealth to the rich, and magnificence to the great. Our English merchant converts the tin of his own country into gold, and exchanges its wool for rubies. The Mahometans are clothed in our British manufacture, and the inhabitants of the frozen zone warmed with the fleeces of our sheep.

"When I have been upon the 'Change, I have often fancied one of our old kings standing in person where he is represented in effigy, and looking down upon the wealthy concourse of people with which that place is every day filled. In this case, how would he be surprised to hear all the languages of Europe spoken in this little spot of his former dominions, and to see so many private men, who in his time would have been the vassals of some powerful baron, negociating like princes for greater sums of money than were formerly to be met with in the royal treasury! Trade, without enlarging the British territories, has given us a kind of additional empire. It has multiplied the number of the rich, made our landed estates infinitely more valuable than they were formerly, and added to them an accession of other estates as valuable as the lands themselves."

But, great as these advantages are, even they are not all the benefits which commerce bestows upon us. Commerce not only distributes the gifts of nature, as Mr. Addison beautifully expresses it, but it also distributes the gifts of science and of art. It enables the inhabitants of each country to profit not only by the discoveries of the natives of its different provinces, but by those of the inhabitants of every other country. The machine invented by Mr. Samuel Hicks, of the United States, for separating cotton wool from the pod, is not less beneficial to us than to the Americans;—and the beautiful machinery of Watt, and Arkwright, by reducing the cost of our manufactures, has been productive of as great advantages to our foreign customers as to ourselves. The effect of commerce in this respect is, indeed, surprising, inasmuch that a process discovered in Calcutta, or New Orleans, will generally be found to be adopted, a few months afterwards, in Rouen or Manchester.

It must be confessed that mistaken views of commerce, like mistaken ideas of religion, have frequently led to wars and bloodshed. But when the principles of commerce come to be rightly understood, it will be seen that no commercial war can ever attain its end. The sword may, indeed, extend a dominion over a barren and desert country, or over reluctant and rebellious subjects, but Providence has declared that it is by industry alone that individuals, and, consequently, nations can become wealthy, powerful, or refined.

When Mr. Pitt, in 1786, laid before the House of Commons the commercial treaty which he had entered into with France, for the purpose of removing the existing restrictions on the trade between the two countries, he delivered his sentiments in a speech as remarkable for its point and eloquence as for the sound, manly, and constitutional principles which it enforced. In reply to an argument inculcating constant jealousy of France, Mr. Pitt inquired, whether, by the term "jealousy," was meant that species of jealousy which was either mad or blind,—which would either *madly* throw away the advantages within its reach, or *blindly* grasp at what it could never obtain, and which, if obtained, would end in their total ruin? Was the necessity of a continued war with France so evident and pressing, or was a pacific intercourse with that country so odious, that we must

forego all the commercial advantages which would result from a friendly and amicable treaty? To say that two countries must, from their nature, for ever remain at enmity, was a libel on the constitution of nations, and supposed diabolical malice in the constitution of man.

Those nations which enjoyed the most extensive commerce have always been found to make the most rapid progress in wealth and civilization. Dr. Smith has shrewdly remarked, that the learning and riches of ancient Egypt were owing to the facilities of commercial intercourse between the different districts of the country, afforded by the navigation of the Nile;—and the same great authority has observed that the comparative civilization of the nations bordering on the Red Sea and the Mediterranean was owing to their maritime situation. The prophet Ezekiel has left a beautiful and splendid description of the wealth and commerce of the Tyrians. This people took advantage of their situation at the east of the Mediterranean to purchase from the Idumeans, and the other nations inhabiting the shores of the Red Sea and the Persian Gulf, tea, raw coffee, raw silk, and other native productions, which they afterwards disposed of to the Greeks and Gauls, and the nations on the north and west of the Mediterranean. This they were the more easily enabled to do from the circumstance of the Mediterranean and Red Seas having no tides, and consequently no waves except such as were caused by the influence of the wind,—which, in times when the compass was unknown, and when navigators were unwilling to venture far from the land, must have facilitated their commerce in a wonderful degree.

But commerce not only diffused over Gaul and Italy a taste for foreign commodities, but it dispelled, in a great measure, the darkness and ignorance which had hitherto preserved undisturbed the sovereignty of the dominion of mind in Europe. The Phenicians instructed the instructors of western Europe, and it is to them that we are indebted for the most valuable of all discoveries, the gift of letters. Those nations which enjoyed an extensive commerce were enabled to found colonies in different situations, which added much to the importance and magnificence of their mother countries, insomuch that Carthage, the most powerful of these colonies, eclipsed even Tyre in wealth and grandeur, and was enabled for nineteen years to wage a bloody and doubtful war with Rome herself for the sovereignty of the world.

When Tyre was destroyed by Alexander of Macedon, the traffic which she had carried on was transferred to Alexandria, which, from her situation on the shore of the Mediterranean, and near the head of the Red Sea, soon became the grand emporium for the interchange of European and Asiatic commodities.

At the period of the decline of the Roman Empire, when the different provinces of Italy became a prey to the incursions of the Goths and Vandals, commerce was almost wholly suppressed. A number of individuals from Amalphi and the neighbouring districts, fleeing from the tyranny and oppression of these barbarians, took refuge in a cluster of small islands near the head of the Adriatic Gulf. It was here that Venice, rising from the surface of the deep, beheld, undisturbed, for many centuries, the rise and fall of empires, the revolutions of states, the downfal of tyrants, and the change of dynasties;—till, at length, this last surviving witness of antiquity, and the only remaining link which connected ancient and modern Europe, is herself experiencing the decline to which all nature is subject, and is fast sinking into the bosom of the waves whence she rose.

After the decline of commerce in the middle ages, the spirit of commercial enterprise was first awakened in the free cities of Italy. During the twelfth and thirteenth centuries, the commerce of Europe was almost exclusively in the hands of the Italians, better known by the name of Lombards. Numbers of them were established in every country,—the greatest facilities were given to their operations, and the ancient laws against foreigners were repealed with regard to them.

But the spirit of commercial industry, which was thus kindled in the south of Europe, was not long of communicating itself to the north. In 1241, the free city of Lubec entered into a confederacy with the neighbouring states for mutual protection against the pirates who infested the Baltic Sea. The advantage of this measure soon manifested itself, and other cities acceded to the confederation, so that in a short time eighty of the most considerable cities, between the Baltic and Lyons-on-the-Rhone, joined in the famous Hanseatic League, which became so formidable that its alliance was courted, and its enmity dreaded, by the most powerful Princes in Europe. Their commercial operations were regulated by laws passed in a common assembly of that body; and certain towns were fixed upon, the principal of which was Bruges, in the Netherlands, where manufactures were established and commerce carried on. Here the Lombards brought the spices and delicacies of the East, and exchanged them for the coarser but not less useful commodities of the North.

The commerce of England increased with the increase of the commerce of her neighbours. It is remarkable that there is a clause in Magna Charta which stipulates that foreign merchants shall have full liberty to come into, and depart out of, the kingdom, and to buy and sell wherever they shall think proper. In the reign of Edward III. a law was passed, abolishing the disgraceful practice, which had formerly existed, of making one alien liable for the debt of another. But the reign of Edward III. is chiefly memorable from its being the period of the introduction of the woollen manufacture into England. In 1331, Edward, taking advantage of the discontents which prevailed amongst the Flemish, invited a number of the inhabitants of Flanders to come over and settle in England. These people accepted Edward's invitation, and it was by them that the English were initiated in the art of manufacturing wool. Since this period, the commerce of England has advanced with rapid strides, accompanied, hand in hand, by wealth, civilization, and power.

Brief and imperfect as this sketch of the early history of commerce must necessarily be, I cannot close it without noticing the discovery of the mariner's compass,—an event which has contributed more, perhaps, than any other to increase the comforts, conveniences, and luxuries of mankind. The Italians claim the merit of its discovery for Flavia Gioio, a citizen of Amalphi, who, they say, made the discovery somewhere about the middle of the fourteenth century. Dr. Robertson has adopted this view of the subject; but passages are to be found in French writers, nearly two centuries before the above period, which speak of the polarity of the magnet in the most unequivocal terms. But to whomsoever the merit may be due, it must be acknowledged that the era of the discovery of the compass is the most important period in the history of commerce and navigation. It has extended the former to the most distant shores of the habitable globe, and has multiplied its operations to an extent which had never been contemplated by preceding ages. It has rendered the latter comparatively safe and expeditious, by enabling the navigator to launch boldly out into the deep, without fear of rocks or shoals. It was by its assistance, that, in 1387, the Portuguese, under Vasco de Gama, were enabled to double the Cape of Good Hope and arrive at the East Indies, and that the persevering and enterprising spirit of Columbus was rewarded by the discovery of a new world. It has united all mankind into one vast commercial commonwealth, and has enabled each separate state to profit by the discoveries and inventions of the whole. It has brought individuals together from the most distant corners of the world;—it has made mankind friends instead of enemies;—it has obliterated ancient prejudices, and has contributed to the advancement of wealth, literature, and refinement.

"Hic segetes, illic veniunt felicius uvæ;
Arborei fœtus alibi, atque injussa virescunt
Gramina.—Nonne vides, croceos ut Tmolus odores,
India mittit ebur, molles sua tura Sabæi?
At Chalybes nudi ferrum, virosaque Pontus
Castores, Eliadum palmas Epirus equarum?
Continuo has leges æternaque fœdera certis
Imposuit natura locis."—*George.*

Correspondence.

ASHTON ASSEMBLIES.

Jacob, the scourge of grammar, mark with awe,
Nor less revere him, blunderbuss of law.
Pope's Dunciad, b. 3, 150.

Cogite conallium et pacem laudate sedentes.
Virgil.

TO THE EDITOR.

SIR,—Your correspondent *Observator*, of Chorley, has not, in his notice of *Ashtonian's* letter, quite extricated the *spem gregis* of the Ashton assembly from the woful dilemma in which the Ashtonians and Ashtonienses have placed an elegant scholar and philosopher. However, as "*Gravissima est probi hominis iracundia*" the Ashtonienses, "*iram deponere*," notwithstanding feel a little chagrined that their brethren do not attempt "*servare gregis*," and collect together the "*elegantes elegantiorum*" of the town, to trip the light fantastic toe, and adorn their hibernal festal scenes. The neighbouring gentry not at all liking the appellation of "*mutum et turpe pecus*," conceive that there may have been a conspiracy for any thing they know against wit and learning; or it might have been a question, whether philosophy and dancing are consistent; or perhaps there exists in the minds of some a fear lest something should be introduced into the ball-room quite irrelevant to the customary rules of education; or that some encroachment might be made upon their very language, and either Greek, Latin, or French spouted instead of good old English; this, however, is certain, though the secrets of the committee-room are not known, that where a gentleman possesses, and at all times attends to the very essence of Chesterfield's politeness, and, as *Observator* says, pays his subscription up, he is undoubtedly an acquisition to any ball-room, provided he can dance as well as philosophize; but, mind you, let the "gall'd jade wince," if any such scholar, philosopher, or dancer, finds an amiable reception in the card-room, * * * * * * * * *

The Ashtonienses cannot but participate with the feeling of the *spes gregis* on this occasion, for they are aware that their brethren, the Ashtonians, are a stubborn race, having a good deal of the Gothic in their composition, and not so familiar as the *spes gregis* with the Grecian and Roman graces; and we, the neighbouring Gentiles and scribes, agree perfectly with the *spes gregis*, in his exhibiting the "head and front of his offending," considering the character of a gentleman an interesting subject of discussion, disclaiming all party feeling. If the said *spes gregis* has attained the "*ne plus ultra*" of perfection in the fashionable, as well as the philosophic world, he is an object of the greatest commiseration if he is not allowed to show such *warrantable* qualifications in the ball-room, at least if not in the card-room, of these most select and accomplished assemblies. *Ashtonian*, however, will not forget that the old adage, "*Amantium iræ*," &c. is in danger of being applicable in this case.—Yours, &c. TRIPTALIS.

Stayley Bridge, December 15, 1824.

A COMMON ENEMY.

TO THE EDITOR.

SIR,—If, after the last war, of nearly thirty years' continuance, it were required, for the good of mankind, to designate, in terms the least liable to objection, what formidable foe still stalks abroad; and, disregarding the decrees of monarchs, the recurrence of seasons, hurricanes, or earthquakes, with resistless operation, in these regions, renders human existence distressing in its course, and short in its duration;—it might be replied, catarrh, or common cold. Colds, certainly, are the heralds of innumerous diseases; and it is impossible to state the extent of their destructive effects; but I wish, at this period, to have it recorded, that the only, total, and exclusive cause of their having such effects, is, ignorance of the animal economy, and consequent exterior filth.

What medicine, forced into the stomach, would remove either one or the other of those causes, it is useless to inquire; but it is twenty-five years since I was in that manner afflicted; and the dreadful sufferings I underwent, during twenty years antecedent to that period, and the care and security, in those respects I have since experienced, are contrasts not to be regarded with indifference: desiring, therefore, to make myself amenable to the tribunal of public observation, I hereby declare and determine, that, though my avocations impose upon me close confinement to small rooms, and alternate exposure to every state and transition of the atmosphere, I will not, during the remainder of my existence, be troubled with catarrh or cold.

I am, Sir,
Your humble servant,
14, *Concert-street, Liverpool*, JAS. OGDEN.
8th December, 1824.

Vive la Bagatelle.

"In order to employ one part of this life in serious and important occupations, it is necessary to spend another in mere amusements." JOHN LOCKE.

"There is a time to laugh and a time to weep."—SOLOMON.

RECREATION I.

We lately introduced to our readers a singular experiment, to prove that it is difficult, if not impossible, by force, to separate the two hands of any person holding them in a particular manner; which will be best understood, by referring to the *Kaleidoscope* of September 28.

The following recreation, though less difficult of explanation, will surprise those who have never seen it tried:

Let the two clenched hands be placed in contact with each other (as shown in the figure) with the two thumbs together, the nails upwards, and the fingers pressed as closely together as possible. When in this position, the two hands may be easily separated, by means which appear altogether incompetent to effect such a purpose. The person whose hands are joined, as in the sketch, we shall call A, and the other, who undertakes to seperate them, B. B stands opposite A *(vis-a-vis)* B with the forefinger of his right hand gives a smart stroke on the upper side of the knuckle of the forefinger of A's left hand; at the same moment, B with the forefinger of his left hand, strikes the under side of A's right hand. This simple stroke of the two forefingers of B made at the same moment will drive A.'s hands asunder, the right hand flying upwards, and his left downwards. A child, by this means, may separate the clenched hands of a grown-up person.

RECREATION II.

Place a wafer or a piece of paper on the ceiling of a room; or if there be any mark upon the ceiling, it will answer the same purpose. Then keeping your eye fixed upon such mark, turn round several times, pointing with your finger to the mark; and after making three or four revolutions, find your way out of the door, if you can.

NO. III.—A PUZZLE.

A farmer sent his three daughters to market—one with ten eggs, the second with thirty, and the third with fifty eggs: they all sold their eggs at the same price, and each brought home the same money. At what price and in what proportion were they sold?

NO. IV.

TO THE EDITOR.

SIR,—My correspondence being referred to you by the editors of the *Mercury*, I take the liberty of submitting, as an *imprimis* to the communication of my *bagatelles*, the following:

The price or rate per 120 being given in *pounds* to find the price or rate of *one*, multiply that price by 2, and the product will be the answer in *pence*. Thus, suppose 120 to be £3, the price of one will be twice 3, that is *sixpence*; and, having the price of one in pence to find that of 120, divide it by two, and the quotient will be the answer in pounds. How is this rule found?—I am, Sir, very respectfully, yours, &c.

ARCHIMEDES, JUNIOR.

NO. V.

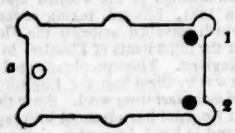
TO THE EDITOR.

SIR,—As this is the season when the holiday folk visit their friends, I shall suspend, for the present, any further description of exploits which may endanger their young necks; and shall furnish you with a few simple recreations which may be performed at their fire sides.

The following puzzle belongs rather to the billiard-room than to the drawing-room; but it may be transferred to the latter, merely substituting a few marbles for billiard-balls. I shall first describe the problem, as if it were to be performed on the billiard-table, and afterwards show how it may be transferred to the parlour, or nursery.

The annexed figure represents the pockets of a billiard-table; near the mouth of which are two dark balls. (*a*) represents a white ball; and the puzzle is how the ball *a*, may, by one stroke of the cue, be made to pocket both the other balls; or, in other language, drive them into the pockets.

As this is billiard phrasecology, we shall endeavour to render it intelligible to our young friends, who may wish to amuse themselves with the experiment, after the table-cloth is withdrawn. This they may very easily do, by attending to the following directions:



For a billiard-table, substitute a book: at each of the two corners of which (1, 2) place a marble; at the other extremity of the book must be placed another marble (*a*), which being flirted by the finger, shall force both the marbles (1, 2) off the book.—Yours, &c.

CONUNDRUMS.

We would not attach more value to mere bagatelles than they merit, but we may be permitted to say, that the various puzzles and original conundrums which have appeared from time to time in the *Kaleidoscope*, have not been deemed unworthy of the patronage of the metropolitan caterers for the public. We have now before us several recently published works, which are greatly extolled in the newspapers; in which we recognize many of our old *Kaleidoscope* friends, adopted without any acknowledgment. In imitation of such examples, we shall in future appropriate whatever we find in this way, without ceremony. We shall commence our collection, however, with a few originals, by our old correspondent *Bathos*, who appears to be as incorrigible as ever.

1. Why is it dangerous to admit a butcher into a cutler's shop?

2. Why does modesty resemble a Miss in her teens?

3. Why is an auctioneer always pleased to see sour looking people at his sale?

By Anonymous.

4. My first marks time; my second wastes it; and my whole tells it.

5. My first denies; my second laments; and my whole was a man saved from drowning.

6. My first is under my whole; and my whole is under my second.

[INSERTED AT THE REQUEST OF A FRIEND.]

ON LANGUAGES.

[FROM THE LONDON MAGAZINE.]

As a depository for the current accumulations of knowledge, German literature far exceeds all others for vast compass, variety, and extent. The mere number of books published annually in Germany,* compared with the annual product of France and England, is alone a satisfactory evidence of this assertion. With relation to France, it is a second argument in its favour, that the intellectual activity of Germany is not intensely accumulated in one great capital, as it is in Paris; but whilst it is here and there conveyed intensely enough for all useful purposes (as at Berlin, Leipsic, Königsberg, Dresden, Vienna, Munich, Stuttgardt, &c.) it is also healthily diffused over the whole territory. There is not a sixth-rate town in Protestant Germany which does not annually contribute its quota of books: intellectual culture has manured the whole soil; not a district but it has penetrated—

Like spring,
Which leaves no corner of the land untouch'd.

A third advantage on the side of Germany (an advantage for this purpose) is its division into a great number of independent states. From this circumstance, it derives the benefit of an internal rivalship amongst its several members, over and above that external rivalship which it maintains with other nations. But the most conspicuous advantage of the German literature is the great originality and boldness of speculation, and the character of masculine austerity and precision impressed upon its scientific labours by the researches of the native philosophers.

* This statement has lately been communicated, by Mr. Merrit, to the Philosophical Society in this town, and is now in the hands of its secretary, Mr. Wylie.—*Edit. Kal.*

The Beauties of Chess.

"Ludimus effigiem belli".....VIDA.

SOLUTION TO GAME XXV.

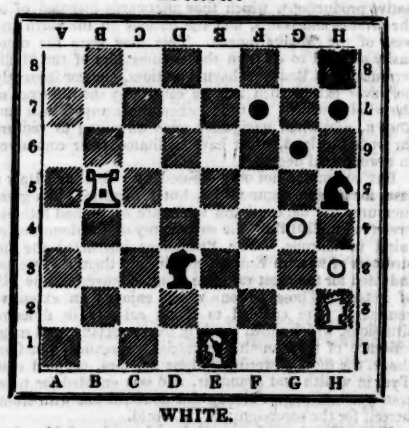
White.		*Black.*	
1 Queen	D—6+	1 Pawn	D—6
2 Castle	F—4	2 Pawn	D—5
3 Knight	E—4+	3 Pawn	E—4
4 Bishop	E—3	4 Pawn	F—3
5 Knight	F—2	5 Pawn	G—2+

MATE.

[NO. XXVI.]

The white to give checkmate in SIX moves.

Black.



WHITE.

The Literary Souvenir.—In our next we shall appropriate some article from this elegant little work.

To Correspondents.

CHRISTMAS DAY.—The intervention of this welcome day, has this week made some change in our arrangements; and if the present *Kaleidoscope* is not found to contain so much variety as usual, our readers will be so indulgent as to bear in mind, that on the Saturday, which is usually the day for arranging our subjects, all our printers were singing *"Holly and Joy,"* and thinking of any thing except work. The anticipation of Christmas Day induced us, early in the week, to prepare two articles of more than usual length, viz. the report of Mr. M'Culloch's Lecture on Commerce, and the singular article from the *Scotsman*, on what we call the new mechanical paradox. They are both, however, valuable documents, for which we hope no apology can be necessary to any class of our readers. The reason we have just assigned, will, we trust, be a satisfactory apology for our merely stating, that we have been favoured with the communications from the following correspondents: *Anon—N.—W. P.—A Constant Reader—Scepticus—219—Plectrum—X. I.—W. P.—A. A. W.*

DEATH WATCHES.—We shall attend to the inquiry of *A Subscriber*, probably next week; and shall take an early opportunity of publishing a paper on this subject, which we have had in reserve for some time.

The communication of *J. H. Jun.* of Lichfield—the Essay—the lines of *A. S.* on Madame Riego—*G. B.*'s lines on a favourite Dog, and his essay on Animal Appetite—and the essay of *L. L.* shall on no account be delayed beyond next week. Their present insertion has been rendered impossible, by the length of the article on the Mechanical Paradox, and Mr. M'Culloch's Lecture.

THE HAMILTONIAN SYSTEM.—We have just been favoured with a very humorous letter on this subject, from an intelligent and witty correspondent, at Blackburn. Its perusal will make even Mr. Hamilton himself laugh.

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